

## RESUME OF RESEARCH and CV OF

Thibault DAMOUR

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(September 2019)

Field: GRAVITATION AND COSMOLOGY

Main Themes of Research: black holes, gravitational waves, binary pulsars, experimental tests of relativistic gravity, general-relativistic two-body problem, string cosmology.

### RESUME OF RESEARCH

The fields of Relativistic Gravity and Cosmology have been undergoing a remarkable development since the sixties. This blooming is due to many factors, but the main driving factor has been a constant flow of new observational data and a continuous improvement in experimental techniques. This has led, and still leads, to a healthy dialogue between experiment and theory. The work of T. Damour is theoretical, but has often been closely connected with what can be learned about reality from experiments. T. Damour has worked with more than 100 collaborators, and has created a well-recognized school of “Analytical Relativity” through his students, postdocs and collaborators (N. Deruelle, L. Blanchet, G. Esposito-Farèse, A. Buonanno, B. R. Iyer, A. Nagar, D. Bini, ...).

In the following, one selects from his publication list the most significant contributions. (The numbers in brackets refer to the publication list in his CV below.)

#### Binary Pulsars and Tests of Strong-Field Gravity

- T. Damour has provided the first complete proof that, within General Relativity, a binary system of compact objects (neutron stars or black holes) dynamically evolves under gravitational radiation damping so that its period decays secularly [21], [27], [31]. This was done by iteratively solving Einstein’s field equations, together with the equations of motion of the two bodies, to fifth order in  $v/c$ , by a new method taking into account the strong self-gravities of the bodies. The result of this calculation, when applied to the binary pulsar PSR 1913+16 discovered by Russell Hulse and Joe Taylor, gives a theoretical prediction for the orbital period decay equal to  $\dot{P}^{\text{GR}} = -2.4025 \times 10^{-12}$ . This

theoretical prediction agrees with the experimental value, observed by Joe Taylor and colleagues, within 3 parts in a thousand, after correcting the observed value for a small, but significant, effect coming from the motion of the binary pulsar system in the Galaxy [77].

- Damour and Deruelle derived a theoretical “timing formula” yielding, within General Relativity, the predicted times of arrival, on Earth, of the successive pulses emitted by a binary pulsar [39], [43]. This theoretical timing formula is now standardly used by pulsar observers. The generalization of this parametrized timing formula to a wide class of relativistic gravity theories [54] has led to the conception of new tests of relativistic gravity [90]. It has been possible to perform some of these new experimental tests in the case of the binary pulsar PSR 1534+12, and this has led to the first high-precision ( $\sim 1\%$ ) confirmations of the validity of Einstein’s theory in the (quasi-static) strong-field regime (separately from radiative effects) [91].

- Damour and Ruffini [3] were the first to predict that the general relativistic spin-orbit coupling might be observable in binary pulsars, through its effect on the shape of the pulse. This effect has been very recently observed ( by Michael Kramer in Germany, and by Joe Taylor and Joel Weisberg in the USA), and constitutes a conceptually important additional verification of General Relativity.

### **Black Holes**

Damour has introduced a new way of thinking about the physics of black holes, consisting in focussing on the local physical properties of the surface of black holes [12], [17]. In this approach, a black hole is viewed as a bubble, or membrane, endowed with such classical quantities as electric currents, surface resistivity, viscosity, etc. Surprisingly, one can then prove, starting only from Einstein’s field equations, that these quantities satisfy (exactly) some well-known classical laws: Ohm’s law and Joule’s law, with a surface resistivity of 377 ohm [12], as well as Navier-Stokes’ equation [17]. The latter Navier-Stokes’ equation of a BH (with the corresponding calculation of the viscosity of a BH) has predated many recent investigations, notably by Son and Starinets (and by Strominger et al.) on the links between gravity and the viscous hydrodynamics of strongly interacting quantum field theories (and the fluid/gravity correspondence).

### **String Theory, Gravity and Cosmology**

String Theory a priori predicts the existence of new long-range interactions, with gravitational strength. In particular, there should exist a scalar partner of Einstein’s tensor gravitational field, the so-called “dilaton” field, whose predicted coupling to matter necessarily violates the basic Einsteinian postulate of the universality of free fall (equivalence principle). Damour and coworkers discovered a new cosmological mechanism by which such a dilaton could survive in our low-energy universe as a very weakly coupled long-range field [117], [200], [201] (the present smallness of this coupling being naturally enforced by the many  $e$ -folds of expansion of the universe [106], [110]). This work has renewed

the problematics of possible theoretical deviations from Einstein’s theory, and provides a new motivation for ultra-high precision tests of the equivalence principle (such as the ONERA-CNES-ESA MICROSCOPE mission, launched at the end of April 2016). See [350] for the first results of the Microscope mission.

In collaboration with M. Henneaux, it was discovered that the ensemble of (long-range) bosonic fields predicted by String Theory forces the generic behaviour of the geometry near a big bang (or a big crunch) to be chaotic [175]. Further study (in collaboration, notably, with M. Henneaux, H. Nicolai, A. Kleinschmidt and P. Spindel) of this chaotic behavior has led to the discovery of what seems to be a hidden hyperbolic Kac-Moody symmetry in supergravity, or superstring theory [190], [208], [242], [310]. This intriguing Kac-Moody structure is still under active study.

### Gravitational Waves (GW)

Last (but not least), one should mention the line of theoretical works motivated by the construction of ultra-sensitive, kilometer-size detectors of gravitational waves (GW): LIGO/VIRGO/GEO/...

- In a sequence of papers Damour and colleagues (notably Blanchet, Buonanno, Iyer, Jaranowski, Nagar, Schäfer) have:

- (i) refined the theoretical tools needed for analytically computing the motion [195], [22], [311], [316], and the GW emission by generic sources [42], [63], [82],

- (ii) applied these tools to a high-accuracy computation of the waves emitted by compact binaries [124], [128], [224], [233],

- (iii) invented a new method (Effective One-Body formalism), to go beyond the limitations of the perturbative (post-Newtonian) description of inspiralling binary systems, so as to be able to describe the last orbits, the merger and the subsequent ringdown of coalescing binary black holes. The Effective One-Body method led, in 2000 [172] (i.e. five years before Numerical Relativity) to the first, complete description of the waveform emitted by coalescing black holes. It allows one to construct resummed “template waveforms” for the waves emitted by an inspiralling compact binary [150], [169], [171], [172], [276], [277];

and

- (vi) showed how to extract non-perturbative information from Numerical Relativity simulations to improve the latter, analytical Effective-One-Body (EOB) templates [266],[272],[299],[301],[317],[322], [327],[331].

The latter Numerical-Relativity-completed EOB template waveforms have played an essential role for digging small signals out of the noisy output of the US large interferometric detectors of gravitational waves (LIGO), and thereby for being able to discover the gravitational waves emitted by the coalescence of two black holes (starting with the GW150914 and GW151226 events). Indeed, each Numerical-Relativity (NR) simulation takes a couple of months to compute one black-hole coalescence waveform. The first advanced LIGO run used for his search of possible GW signals a bank of 250 000 matched-filter templates that comprised 50 000 post-Newtonian-based inspiral-only templates (for

total masses  $< 4M_{\odot}$ ) and 200 000 inspiral-merger-ringdown black-hole coalescence waveforms computed by using the NR-completed EOB formalism. [These EOB[NR] waveforms were encoded, to speed up calculations, by using Reduced-Order Modelling.] The subsequent more accurate parameter estimation study of the detected signals used two banks of templates: EOB[NR] ones, and “phenomenological” templates based on a certain number of hybrid templates made by joining an EOB inspiral signal with an NR merger-ringdown signal. The EOB work [150], [169], [171], [172], [276], [277], [266],[272],[299],[301],[317],[322],[327],[331] (together with the post-Newtonian-expanded analytical work on the motion [195], [22], [311], [316] and the gravitational-wave emission [42], [63], [82], [124], [128], [224], [233] of binary systems, which enters in resummed form in the EOB formalism) have played an important role in allowing one to search, analyze and establish the physical nature of all the LIGO-Virgo black hole events observed during the first two observing runs, namely GW150914, GW151226, (LVT151012), GW170104, and GW170814 (in particular their compatibility with the final black-hole ring-down signal, which was, starting from the pioneering paper [172], a key element of the EOB waveform). The binary neutron star event GW170817 was detected by inspiral-only (low-mass) post-Newtonian templates (whose computation relied notably on the results of Refs. [195], [22], [311], [316], [42], [63], [82], [124], [128], [224], [233]).

It was shown in [304] that the late phasing of GW signals from coalescing binary neutron stars was significantly modified by the tidal polarizability of the neutron stars so that future binary neutron stars events should allow one to measure the corresponding tidal polarizability parameters, thereby giving a new handle on the neutron star equation of state. The use of the tidal extension of the EOB waveform (developed in [287], [299], [327]) is likely to play an important role for this.

Recently, Damour pioneered the construction of bridges between post-Minkowskian gravity (see [19]), EOB and quantum scattering amplitudes [341], [349].

- Let us also mention the work of Damour and Vilenkin [193], [228] which discovered and analyzed the emission of strong bursts of gravitational waves emitted from cusps (and kinks) on cosmic strings. It was found that such bursts could be detected by LIGO/Virgo down to extremely small values of the string tension. These bursts of gravitational waves have been (so far unsuccessfully) searched-for (using the analytical template derived in [193], [228]) in the initial LIGO-Virgo data. The future will tell whether they can be found in the advanced LIGO-Virgo data.

## CURRICULUM VITAE

(September 2019)

Thibault DAMOUR  
né le 7 février 1951, Lyon (France).

### Diplômes.

1970-1974 : Ecole Normale Supérieure de la rue d'Ulm.

1970-1972 : Maîtrise de Physique.

1973 : DEA de Physique Théorique, option Relativité et Théorie des Champs.

1974 : Thèse de Doctorat de 3ème cycle, spécialité Physique Théorique (Université de Paris VI, 5 juin 1974): "Théorie classique de la renormalisation".  
Agrégation de Sciences Physiques.

1979 : Thèse de Doctorat d'Etat ès Sciences Physiques (Université de Paris VI, 10 janvier 1979): "Quelques propriétés mécaniques, électromagnétiques, thermodynamiques et quantiques des trous noirs".

### Carrière.

1970-1974 : Ecole Normale Supérieure de la rue d'Ulm.

1973-1974 : Laboratoire de Physique Théorique, Institut Henri Poincaré, Paris.

1974-1975 :c Jane Eliza Procter Fellow à l'Université de Princeton, U.S.A. (Physics Department).

1975-1976 : European Space Agency International Fellow à l'Université de Princeton, U.S.A. (Physics Department).

1976-1977 : Service National – Centre d'Etudes Théoriques de la Détection et des Communications, Base Aérienne 117, Paris.

1977-1981 : Attaché de Recherche au CNRS (Groupe d'Astrophysique Relativiste, ER 176, Observatoire de Paris-Meudon).

1981-1985 : Chargé de Recherche au CNRS.

1985-1992 : Directeur de Recherche (2ème classe) au CNRS. [Mise en disponibilité auprès de l'IHES en 1989-1992; Démission du CNRS le 30/09/92].

1989 (octobre) : Professeur Permanent à l'Institut des Hautes Etudes Scientifiques.

### Distinctions.

1978 : Lauréat de la Fondation Singer-Polignac.

1980 : Médaille de bronze du CNRS.

1984 : Prix de physique théorique "Paul Langevin" de la Société Française de Physique.

1990 : Grand Prix de l'Académie des Sciences, France (Prix Mergier-Bourdeix).

1994: First Award de la Gravity Research Foundation (USA).

1994: Membre correspondant de l'Académie des Sciences.

1996: Médaille Einstein de l'Albert Einstein Gesellschaft, Berne (Suisse).

1999: Membre de l'Académie des Sciences (Section de Physique) et Membre de l'Institut de France.

2005: Cecil F. Powell Memorial Medal de l'European Physical Society.  
2010: Membre de l'Academia Europaea  
2010: Amaldi medal of the Società Italiana di Relatività Generale e Fisica della Gravitazione  
2010: Chevalier de l'Ordre National de la Légion d'Honneur  
2016: European Astronomical Society Prize: Lodewijk Woltjer Lecture  
2016: Election à l'American Academy of Arts and Sciences comme Foreign Honorary Member  
2016: Special Breakthrough Prize in Fundamental Physics for detection of Gravitational Waves  
2016: Gruber Cosmology Prize  
2017: médaille d'or du CNRS  
2017: Levi-Civita Prize for the Mathematical and Mechanical Sciences

### **Responsabilités.**

1986-1994 : Directeur-adjoint de l'UPR 176 du CNRS – Département d'Astrophysique Relativiste et de Cosmologie de l'Observatoire de Paris-Meudon.  
1991-1995: Membre nommé du Comité National de la Recherche Scientifique (Centre National de la Recherche Scientifique).  
1991-1996 : Team member and chairman of the theory group du projet de mission spatiale STEP (Satellite Test of the Equivalence Principle) proposé à l'Agence Spatiale Européenne dans le cadre des Medium Size Projects M2 et M3.  
1994-1997 : Membre du Fundamental Physics Topical Team (TT-5), puis du Fundamental Physics Advisory Group (FPAG), de l'Agence Spatiale Européenne.  
1994-2000 : Membre du Comité des Programmes Scientifiques du Centre National d'Etudes Spatiales.  
1995-1997 : Membre du Conseil Scientifique de l'Ecole Normale Supérieure.  
2013-2015 : Member of the Editorial Board of Physical Review D.  
2013- : Membre du Fachbeirat du Max Planck Institut Albert Einstein (Potsdam et Hannover).  
2014- : co-président du Science Working Group de la mission spatiale MICROSCOPE

### **Conférences plénières invitées.**

- Décembre 1974 : Seventh Texas Symposium on Relativistic Astrophysics, Dallas (USA).
- Juillet 1975 : First Marcel Grossmann Meeting on General Relativity, Trieste (Italie).
- Novembre 1975: First Advanced Seminar of the International School of Relativistic Astrophysics, Erice (Italie).
- Novembre 1976 : Second Advanced Seminar of the International School of Relativistic Astrophysics, Erice (Italie).
- Juin 1978 : 26ème réunion de la RCP n°25, IRMA, Strasbourg (France).
- Janvier 1979 : Einstein Centenary Summer School, Perth (Australie).
- Avril 1979 : Journées Relativistes, Angers (France).
- Juillet 1979 : Second Marcel Grossmann Meeting on the Recent Developments of General Relativity, Trieste (Italie).
- Septembre 1980 : 4<sup>o</sup> convegno di Relativita Generale e Fisica della Gravitazione, Pavia (Italie).
- Mars 1981 : Workshop on Approximation Methods for Isolated Systems in Relativistic Gravity, Schloss Ringberg (RFA).
- Mai 1981 : Journées Relativistes, Grenoble (France).
- Juin 1982 : Ecole de Physique Théorique des Houches sur le “Rayonnement gravitationnel”.
- Septembre 1982 : Third Marcel Grossmann Meeting on the Recent Developments of General Relativity, Shanghai (Chine).
- Mai 1983 : Journées Relativistes 1983, Turin (Italie).
- Juillet 1983 : Tenth International Conference on General Relativity and Gravitation, Padoue (Italie).
- Juillet 1983 : Second Rome Astrophysical Meeting: “Precision measurements of relativistic effects in astrophysical systems”, Rome (Italie).
- Septembre 1983 : Encuentros Relativistas Españoles 1983, Majorque (Espagne).
- Novembre 1983 : Journée : “Optique et Rayonnement Gravitationnel”, Paris (France).
- Octobre 1984 : VI Convegno di Relativita Generale e di Fisica della Gravitazione, Florence (Italie).
- Avril 1985 : Journées Relativistes 1985, Marseille (France).
- Juin 1985 : Fourth Marcel Grossmann Meeting, Rome (Italie).
- Juin 1985 : Stueckelberg Memorial Lectures, Lausanne (Suisse).
- Avril 1986 : XIVth Yamada Conference on Gravitational Collapse and Relativity, Kyoto (Japan).
- Juillet 1986 : NATO Advanced Study Institute on Gravitation in Astrophysics, Cargèse (France).
- Juillet 1986 : VIIIth International Congress on Mathematical Physics, Marseille (France).
- Mai 1987 : Second Canadian Conference on General Relativity and Relativistic Astrophysics, Toronto (Canada).
- Juillet 1987 : Newton Tercentenary Conference, Cambridge (Angleterre).

Décembre 1987 : International Conference on Gravitation and Cosmology, Goa (Inde).

Juin 1988 : Journées 1988 “Systèmes de Référence Spatio-temporels”, Paris (France).

Juin 1988 : Atelier “Chronométrage des Pulsars”, Nançay (France).

Août 1988 : Fifth Marcel Grossmann Meeting, Perth (Australie).

Avril 1989 : Journées 1989 “Systèmes de Référence Spatio-temporels”, Paris (France).

Avril 1989 : Journées Relativistes 1989, Tours (France).

Mai 1989 : Workshop on Gravitation, Magneto-convection and Accretion, Schloss Ringberg (RFA).

Janvier 1990 : Xth Moriond Workshop, “New and Exotic Phenomena”, Les Arcs (France).

Mai 1990 : Rencontres Helvétiques de Physique Mathématique, Genève (Suisse).

Mai 1990 : Troisièmes Journées Systèmes de Référence Spatio-temporels / Colloque André Danjon, Paris (France).

Juin 1990 : Workshop on Impact of Pulsar Timing on Relativity and Cosmology, Berkeley (USA).

Septembre 1990 : First William Fairbank Meeting on Relativistic Gravitational Experiments in Space, Rome (Italie)

Septembre 1990 : Elizabeth and Frederick White Research Conference on Gravitational Astronomy, Canberra (Australie).

Janvier 1991 : XIth Moriond Workshop, “Massive Neutrinos, Tests of Fundamental Symmetries”, Les Arcs (France).

Mai 1991 : Journées Relativistes 1991, Cargèse (France).

Septembre 1991 : 81th WE-Heraeus Seminar, “Aktuelle Entwicklungen in der Erforschung der relativistischen Gravitation”, Bad Honnef (RFA).

Décembre 1991 : International Conference on Gravitation and Cosmology, ICGC-91, Ahmedabad (Inde).

Janvier 1992 : XIIth Moriond Workshop, “Massive Neutrinos, Tests of Fundamental Symmetries”, Les Arcs (France).

Mars 1992 : Deutschen Physikalischen Gesellschaft 56 Physikertagung, Berlin (Allemagne).

Avril 1992 : Discussion meeting on “Pulsars as Physics Laboratories”, The Royal Society, London (Angleterre).

Avril 1992 : Journées scientifiques de la Société Française des Spécialistes en Astronomie, Meudon (France).

Mai 1992 : Journées Relativistes 1992, Amsterdam (Pays-Bas).

Juin 1992 : Analyse, Variétés et Physique, Paris (France) (Colloque en l’honneur d’Yvonne Choquet-Bruhat).

[Juin 1992 : 13th International Conference on General Relativity and Gravitation, Cordoba (Argentina) (Participation cancelled because of flight problems).]

Juillet 1992: Ecole d’Eté de Physique Théorique: “Gravitation and Quantizations”, Les Houches (France).

Février 1993 : XIIIth Moriond Workshop, “Perspectives in Neutrinos, Atomic Physics and Gravitation”, Villars-sur-Ollon (Suisse).



Avril 1993 : STEP Symposium, “Testing the Equivalence Principle in Space”, Pisa (Italie).  
 Septembre 1993 : XXIIth International Conference on Differential Geometry Methods in Theoretical Physics, Ixtapa-Zihuatanejo (Mexique).  
 Janvier 1994: XIVth Moriond Workshop, “Particle Astrophysics, Atomic Physics and Gravitation”, Villars-sur-Ollon (Suisse).  
 Mars 1994: XXIXth Rencontres de Moriond, “Electroweak Interactions and Unified Theories”, Méribel (France).  
 Mars 1994: Classical and Quantum Gravity: A Survey Conference, Isaac Newton Institute, Cambridge (Angleterre).  
 Avril 1994: Future Fundamental Physics Missions in Space and Enabling Technologies, El Escorial (Espagne).  
 Juillet 1994: XIth International Congress of Mathematical Physics, Paris.  
 Juillet 1994: Seventh Marcel Grossmann Meeting on General Relativity, Stanford University (USA).  
 Février 1995: STEP workshop, Mürren (Switzerland).  
 Mars 1995: XVth Moriond Astrophysics Meeting, “Clustering in the Universe”, Les Arcs (France).  
 Mai 1995: International Workshop on Supersymmetry and Unification of Fundamental Interactions (SUSY-95), Palaiseau (France).  
 Août 1995: 14th International Conference on General Relativity and Gravitation, Florence (Italie).  
 Septembre 1995: 5th Hellenic School and Workshops on Elementary Particle Physics, Corfou (Grèce).  
 Septembre 1995: Les Houches School on “Astrophysical Sources of Gravitational Radiation”, Les Houches (France).  
 Octobre 1995: Symposium on Fundamental Physics in Space, Londres (Angleterre).  
 Octobre 1995: Réunion du GDR 1053 “Gravitation et Expérience”, Grasse (France).  
 Mai 1996: Journées Relativistes 96, Ascona (Suisse).  
 Novembre 1996: Princeton’s 250th Anniversary Conference, Princeton (USA)  
 Novembre 1996: Workshop on the Scientific Applications of Clocks in Space, Pasadena (USA).  
 Septembre 1997: Les Houches School on “Gravitation and Experiment”, Les Houches (France).  
 Juin 1998: Cosmology and Astroparticle Physics (CAPP-98); CERN (Suisse).  
 Septembre 1998: Around VIRGO, Tirrenia, Pisa (Italie).  
 (Octobre 1998: 40ème anniversaire de l’IHES, Bures (France).)  
 Novembre 1998: The Gravitational Constant: Theory and Experiment 200 years after Cavendish, Londres (Angleterre).  
 Décembre 1998: 19th Texas Symposium, Paris (France).  
 Janvier 1999: XXXIVth Rencontres de Moriond “Gravitational Waves and Experimental Gravity”, Les Arcs (France).  
 Juillet 1999: Third ICRA Network Workshop on Relativistic Astrophysics, Rome et Pescara (Italie).

Septembre 1999: International European Conference on Gravitation: Journées Relativistes 99, Weimar (Allemagne).

Octobre 1999: 4th International Conference on Cosmology, Relativistic Astrophysics and Cosmoparticle Physics (Cosmion 99) in honor of the 80th birthday of Isaak M. Khalatnikov, Moscow (Russie).

Janvier 2000: Colliding Black Holes, ITP miniprogram, Santa Barbara (USA).

Février 2000: Jürgen Ehlers Symposium, Albert Einstein Institute, Golm (Allemagne).

Avril 2000: ESA-CERN Workshop on Fundamental Physics in Space, CERN (Suisse).

Mai 2000: Pauli Centenary Conference, Zürich (Suisse).

Juin 2000: Gravitational Waves: A Challenge to Theoretical Astrophysics, ICTP, Trieste (Italie).

Juillet 2000: 9th Marcel Grossmann Meeting, Rome (Italie).

Octobre 2000: Réunion du GDR 1053 “Gravitation et Expérience”, Grasse (France).

Novembre 2000: Science at the New Millenium Program, Institute of Advanced Studies, University of Western Australia, Perth (Australie).

Janvier 2001: Missions Spatiales en Physique Fondamentale (Journée Scientifique de l’ONERA sous l’égide de l’Académie des Sciences), ONERA, Châtillon (France).

Juin 2001: Frontiers of the Universe (XIIIèmes Rencontres de Blois 2001), Blois (France).

Juin 2001: Colloque Gilles Châtelet, Paris (France).

Septembre 2001: Journées Relativistes, University College, Dublin (Irlande).

Octobre 2001: Réunion du GDR 1053 “Gravitation et Expérience”, Grasse (France).

Octobre 2001: Strings and gravity: tying the forces together (Francqui Colloquium), Bruxelles (Belgique).

Juillet 2002: ICRA Workshop in honor of the 60th birthday of Remo Ruffini, Rome (Italie).

Juillet 2002: International Conference on Theoretical Physics, TH-2002, Paris (France).

Septembre 2002: Joint European and National Astronomy Meeting 2002, Workshop on Varying Fundamental Constants, Porto (Portugal).

Septembre 2002: Conférence Blaise Pascal sur: String/Brane Cosmology, Bures (France).

Septembre 2002: Fête Cremmer-Gervais, Paris (France).

Mars 2003: 10th International Workshop on: “Neutrino Telescopes”, Venise (Italie).

Juin 2003: Workshop on Cosmology and Particle Physics, CAPP2003, CERN, Genève (Suisse).

Août 2003: Nobel symposium on Cosmology and String Theory, Sigtuna (Suède).

Octobre 2003: Réunion du GDR 2062 “Gravitation et Expérience dans l’Espace”, Paris (France).

Octobre 2003: KITP workshop on “Superstring Cosmology”, KITP, Santa Barbara (USA).  
 Janvier 2004: Miami Waves 2004, Miami (USA).  
 Mars 2004: Journée en l’honneur d’Yvonne Choquet-Bruhat, IHES.  
 Avril 2004: Deserfest: A celebration of the life and works of Stanley Deser, Ann Arbor (USA).  
 Septembre 2004: Spanish Relativity Meeting ERES 2004, Miraflores (Espagne).  
 Octobre 2004: Réunion du GDR 2062 “Gravitation et Expérience dans l’Espace”, Nice (France).  
 Décembre 2004: 22<sup>th</sup> Texas Symposium on Relativistic Astrophysics, Stanford University, Palo Alto, Californie (USA).  
 Mars-Avril 2005: Spacetime in Action, 100 Years of Relativity, Pavia (Italie).  
 Avril 2005: Geometry and Physics after 100 Years of Einstein’s Relativity, Potsdam (Allemagne).  
 Avril 2005: Einstein 1905-2005, Séminaire Poincaré, Paris (France).  
 Mai 2005: A Century from Einstein Relativity: Probing Gravity Theories in Binary Systems, Villa Olmo, Como (Italie).  
 Juin 2005: Salon Européen de la Recherche et de l’Innovation, Paris (France).  
 Juillet 2005: 13<sup>th</sup> General Conference of the European Physical Society: Beyond Einstein, Physics for the 21<sup>st</sup> Century, Berne (Suisse).  
 Juillet 2005: Albert Einstein Century International Conference, Paris (France).  
 Septembre 2005: 28<sup>th</sup> Spanish Relativity Meeting (ERE05) “A Century of Relativity Physics”, Oviedo (Espagne).  
 Septembre 2005: Galileo Galilei Institute Inaugural Conference, Florence (Italie).  
 Septembre 2005: Cosmic Strings and Fundamental Strings, Paris (France).  
 Octobre 2005: Réunion du GDR 2062 “Gravitation et Expérience dans l’Espace”, Paris (France).  
 Octobre 2005: Geometry and the Universe, Stony Brook (USA).  
 Novembre 2005: Polyakovfest, Princeton (USA).  
 Novembre 2005: Neuvième rencontre “Physique et Interrogations fondamentales”: Einstein et les horizons de la physique, BNF, Paris (France).  
 Décembre 2005: 23<sup>ème</sup> Conseil Solvay de Physique: “The Quantum Structure of Space and Time”, Bruxelles (Belgique).  
 Décembre 2005–Janvier 2006: 23<sup>rd</sup> Winter School in Theoretical Physics: “Symmetries and Dynamics”, Jerusalem (Israel).  
 Février 2006: First Bego scientific rencontres of the ICRA net, Nice (France).  
 Mars 2006: Confronting Gravity: a Workshop to Explore Fundamental Questions in Physics and Cosmology, Saint Thomas, Virgin Islands (USA).  
 Avril 2006: Eurostrings and Greenfest, Cambridge (UK).  
 Juillet 2006: 11<sup>th</sup> Marcel Grossmann Meeting, Berlin (Allemagne).  
 Août 2006: First Cambridge-Mitchell Texas Conference and Gibbonsfest, Cambridge (UK).  
 Octobre 2006: Boltzmann Conference, Munich (Allemagne).  
 Septembre-Décembre 2006: Trimestre Institut Henri Poincaré sur: “Gravitational Waves, Relativistic Astrophysics and Cosmology”, IHP, Centre Emile Borel, Paris (France).

Mai 2007: Journées Tourangelles de Relativité, Tours (France).  
 Juillet 2007: Ecole de Physique des Houches, session 87 “String Theory and the Real World”, Les Houches (France).  
 Septembre 2007: 2<sup>nd</sup> Stueckelberg Workshop on Relativistic Field Theories, ICRANet, Pescara (Italie).  
 Avril 2008: 15 Years Erwin Schrödinger Institute, Vienne (Autriche).  
 Juin 2008: Post Newton 2008, International Workshop, Jena (Allemagne).  
 Juin 2008: IHES 50, conférence de physique Théorique du cycle du cinquante-naire de l’IHES, Bures-sur-Yvette (France).  
 Juin 2008: Landau 100, L.D. Landau Memorial Conference “Advances in Theoretical Physics”, Landau Institute for Theoretical Physics, Chernogolovka (Russie).  
 Juin 2008: RUSGRAV-13, 13th Russian Gravitational Conference, International Conference on Gravitation, Cosmology and Astrophysics, Moscow (Russie).  
 Juin 2008: “Symmetries in Mathematics and Physics”, conférence en l’honneur de Victor Kac, Cortona (Italie).  
 Septembre 2008: 2008 Parma International School of Theoretical Physics, Parma (Italie).  
 Octobre 2008: The Nature of Gravity, Confronting Theory and Experiment in Space, Workshop at the International Space Science Institute, Berne (Suisse).  
 Novembre 2008: Big Bang and Beyond, Microsymposium on Cyclic and Bouncing Universes, Princeton Center for Theoretical Science, Princeton (USA).  
 Mai 2009: Cosmological Frontiers in Fundamental Physics, Workshop of the International Solvay Institutes, Bruxelles (Belgique).  
 Juillet 2009: 12<sup>th</sup> Marcel Grossmann Meeting, Paris (France).  
 Septembre 2009: Challenges in Theoretical Cosmology, Conference of the Tufts Institute of Cosmology, Talloires (France).  
 Mars 2010: Rencontre IPhT-IHES, Bures-sur-Yvette (France).  
 Juillet 2011: 14<sup>th</sup> Capra Meeting, Southampton (UK).  
 Septembre 2011: Microscope Colloquium I: Testing the Equivalence Principle, From the basis of General Relativity to a key to Quantum Gravity, ONERA, Palaiseau (France).  
 Mars 2012: Quantum Gravity in Paris, Orsay et APC, Paris (France).  
 Juin 2012: Relativity and Gravitation – 100 Years after Einstein in Prague, Prague (Tchécoslovaquie).  
 Septembre 2012: Symmetries, unification and the search for quantum gravity (conference on the occasion of Hermann Nicolai’s 60<sup>th</sup> anniversary), Golm (Allemagne).  
 Octobre 2012: From Quantum to Cosmos 5, Cologne (Allemagne).  
 Novembre 2012: Conférence de l’Académie des Sciences “Henri Poincaré”, Paris (France).  
 Janvier 2013: Microscope Colloquium II: Testing the Equivalence Principle, ONERA, Palaiseau (France).  
 3-21 juin 2013: Pescara, Italie. The 2013 yearly ICRANet Scientific Meeting on Relativistic Astrophysics, on the Occasion of the 50th anniversary of the Kerr solution. Trois conférences respectivement intitulées: – Effective One Body

Approach to the Dynamics of Binary Black Hole Systems, – Gravitational Interaction of Two Spinning Black Holes, – Quantum Supersymmetric Cosmology and its Hidden Kac-Moody Structure.

15-17 Octobre 2013: Nice, France. From Quantum to Cosmos 6 (Q2C6). Une conférence intitulée: Gravitational Waves and Dynamics of Coalescing Binary Systems.

4-5 décembre 2013: Paris. Hommage a Michel Hénon. Une conférence intitulée: Chaos in Classical and Quantum Cosmological Billiards.

25 mars 2014: Conference Afterwork (organisée par Société Générale Private Banking), Luxembourg (Luxembourg)

30 mars - 19 avril 2014: Cook's Branch Meeting, Great Brampton House, Hereford (Royaume-Uni)

31 mars - 4 avril 2014: WE-Heraeus Seminar, The Strong Gravity Regime of Black Holes and Neutron Stars, Bad Honnef (Allemagne)

20-23 mai 2014: Gravitation, Solitons and Symmetries, Tours (France)

8-11 octobre 2014: 26<sup>th</sup> Solvay Conference on Physics, Astrophysics and Cosmology, Bruxelles (Belgique)

3-4 novembre 2014: Microscope Colloquium III, ONERA, Palaiseau (France)

18 novembre 2014: Gala des Friends of IHES, New-York (USA)

20 novembre 2014: Institute for Advanced Study, Princeton (USA)

28 décembre 2014 - 8 janvier 2015: 32<sup>nd</sup> Winter School in Theoretical Physics on 100 Years of General Relativity: From Theory to Experiment and Back, Jerusalem (Israel)

1er avril 2015: Trimestre Quantique, Quantum Cosmology: from Einstein to Everett, DeWitt, et al. and back, IHES, Bures-sur-Yvette (France)

19 février 2015: Conférence organisée par Société générale Private Banking (Monaco)

4 mars 2015: Solvay Colloquium: Gravitational Waves from Coalescing Binary Black Holes, Université Libre de Bruxelles, Bruxelles (Belgique)

5-6 mars 2015: Solvay Workshop, "Le charme discret de la Symétrie" en l'honneur de Marc Henneaux, Université Libre de Bruxelles, Bruxelles (Belgique)

7-10 avril 2015: Quantum Gravity in Paris, Paris (France)

28 avril 2015: Cycle 2015 Conférences SCOR, Paris (France)

4-8 mai: International workshop on Future Prospects for Fundamental Particle Physics and Cosmology Workshop, Simons Center for Geometry and Physics, Stony Brook (USA)

4-5 juin 2015: International Workshop in honor of Philippe Spindel: About Various Kinds of Interactions, Université de Mons, Mons (Belgique)

6-9 juillet 2015: International Workshop on Cosmological Frontiers in Fundamental Physics, Université Libre de Bruxelles, Bruxelles (Belgique)

12-18 juillet 2015: International Conference, 14th Marcel Grossmann Meeting on General Relativity, Università di Roma "La Sapienza", Rome (Italie)

15 octobre 2015: Cycle Les ateliers de l'Esprit (organisé par Société Générale Private Banking), Hôtel Intercontinental Paris LeGrand, Paris (France)

21 octobre 2015: Mercredis de Thélème, Université François-Rabelais, Tours (France)

16-17 novembre 2015: International Conference, Testing the Equivalence principle, MICROSCOPE Colloquium IV, ONERA, Palaiseau (France)

16-20 novembre 2015: General Relativity: A Celebration of the 100th Anniversary, Institut Henri Poincaré, Paris (France)

26 novembre 2015: Relativité Générale et trous noirs: un siècle de développement, IHES, Bures-sur-Yvette (France)

30 novembre - 2 décembre 2015: International Conference - A century of General Relativity, Harnack House, Berlin (Allemagne)

8 décembre 2015: La relativité générale aujourd'hui, demain et après-demain, BNF, Paris (France)

14-16 décembre 2015: Conférence International Relativity and Geometry in memory of André Lichnerowicz, Institut Henri Poincaré, Paris (France)

18 et 25 février 2016: Cours, Gravitational Waves and Binary Systems, "Ondes gravitationnelles et coalescence de trous noirs", dans le cadre des "Cours des professeurs permanents de l'IHES", Bures-sur-Yvette (France)

5 avril 2016: Exposé: "Théorie du mouvement et du rayonnement gravitationnel de deux trous noirs", dans le cadre de la Conférence publique organisée par Thibault Damour, Michel Davier et Sébastien Balibar, Académie des Sciences, Paris (France)

28 avril 2016: Conférence: Ondes gravitationnelles et trous noirs, Institut Fourier, Grenoble (France)

23-26 mai 2016: Gravitational Waves, General Relativity and Fundamental Physics; talk on "Thoughts on the Future", Albert Einstein Institute, Hannover (Allemagne)

21 juin 2016: Gravitational Waves and Black Holes, Graduate Center, City University of New York (USA)

22 juin 2016: Gravitational Waves and Black Holes, National Arts Club, Friends of IHES, New York (USA)

23 juin 2016: Proust and Einstein: in Search of Time, Librairie Albertine, New York City, New-York (USA)

27 juin - 1er juillet 2016: 19<sup>th</sup> Capra Meeting on Radiation Reaction in General Relativity, talk on "Effective One-Body theory and Self-Force", Meudon Campus of Paris Observatory, Meudon (France)

4 juillet 2016: European Week of Astronomy and Space Science, Lodewijk Woltjer Lecture on "Gravitational Waves and Coalescing Black Holes", Athènes (Grèce)

15-26 août 2016: Gravitational Waves from Coalescing Binary Black Holes: Theoretical Aspects, Niels Bohr International Academy, Copenhagen (Danemark)

9-11 octobre 2016: Foundations of the Theory of Gravitational Waves NORDITA, Alba Nova University Center, Stockholm (Sweden)

10 novembre 2016: Théorie et détection des ondes gravitationnelles, Les Amis de l'IHES, IHES, Bures-sur-Yvette (France)

25 novembre 2016: Journée ProustTime 2, ENS, Paris (France): Le Temps en Physique; Sur les traces du Temps disparu

29 novembre 2016: Ondes gravitationnelles et trous noirs, Les Mardis de l'Espace des sciences, Rennes (France)

5-9 décembre 2016: Workshop on Analytic methods in General Relativity, International Center for Theoretical Physics, South American Institute for Fundamental Research (Sao Paolo, Brazil) [remote talk]

10-12 janvier 2017: Modern developments in General Relativity and their Historical Roots, Department of Mathematics, King's College, London (Royaume-Uni)

23-26 janvier 2017: Conference on 90 Years of Quantum Mechanics, Institute of Advanced Studies, Nanyang Technological University (Singapour)

14 février 2017: Ondes gravitationnelles et Trous Noirs, Ambassade de France en Italie (Palazzo Farnese, Rome)

16 février 2017: L' enigma della gravità, GiovedìScienza (Turin, Italie)

22-24 mars 2017: Garyfest: Gravitation, Solitons and Symmetries (Le Studium conférences, Laboratoire de Mathématiques et Physique Théorique, Tours)

9 mai 2017, Qu' est ce que la gravité ? , IPhT, Saclay (orme des merisiers)

[29 mai- 1 juin 2017, Black Holes, Quantum Information, Entanglement and All That; conférence organisée par T. Damour, V. Pestun et E. Rabinovici (IHES).]

26-30 juin 2017: The Era of Gravitational-Wave Astronomy 33rd Institut d' Astrophysique de Paris Colloquium (IAP, Paris, France)

29 juin 2017: "Satellite Microscope: premier test spatial du principe d' équivalence", 18ème assemblée générale de l' Electronic Business Group (Paris)

3-7 juillet 2017: 24ème Congrès Général de la Société Française de Physique (Orsay)

10-14 juillet 2017: Mathematics, Physics and their Interaction [Christodoulou Fest], ETH Zürich (Suisse)

18-20 août 2017: Edinburgh International Book Festival [Mysteries of the Quantum Universe] (Edinburgh, Ecosse, UK)

12-15 septembre 2017: Spanish-Portuguese Relativity Meeting EREP17 (Malaga, Spain)

19-22 septembre 2017: Advances in Mathematics and Theoretical Physics (Accademia dei Lincei, Rome, Italie)

4 décembre 2017, Conférence de presse résultats Microscope (CNES, Paris)

[24-27 octobre: Quantum Gravity: Physics & Philosophy; conférence organisée par Gabriel Catren, Thibault Damour, Elie During et Federico Zalamea (IHES).]

1 novembre 2017: Genova Festival della Scienza (Genova, Italie)

3 novembre 2017: Lucca Comics & Games, Il Mistero del Mondo Quantistico (Lucca, Italie)

6-10 novembre 2017: The Message of Quantum Science II How much have we learned in the past five years (ZIF Workshop, Universität Bielefeld, Allemagne)

16-17 janvier 2018: Miniworkshop: Four challenges in gravitational-wave astronomy with neutron stars, Istituto Nazionale di Fisica Nucleare, Sezione di Milano Bicocca - Gruppo Collegato di Parma PROMETEO Virgo Group (Parma, Italy): Towards Improving the Analytical (EOB) Description of Compact Binaries; and Gravitational Waves and Coalescing Black Holes

13 février 2018: Conférence-débat: Les trous noirs: leur nature, et leur rôle en physique et en astrophysique (Académie des sciences, Paris, France): Les trous noirs : une introduction

15 février 2018: *Rencontre Science et Société, Intemporelles* : Einstein et Proust : le Temps existe-t-il ? (Paris, France)

19-20 février 2018: The legacy of Tullio Levi-Civita: a scientific conference in honor of Tullio Levi-Civita (Padova, Italie): Riding Upon the Horse of True Mathematics: Tullio Levi-Civita and his Impact on Einstein's Theory of General Relativity; et Gravitational Waves and Binary Black Holes

14 mars 2018: *Conférence de physique et de mathématiques* : Ondes gravitationnelles et trous noirs binaires (Université de Montpellier, France)

21 mars 2018: La physique quantique se dessine (conférence illustrée par M. Burniat) (Université Libre de Bruxelles, Belgique)

9-13 avril 2018: ERC Exceptional Quantum Gravity Kickoff Meeting, (Banyalbufar, Mallorca, Espagne): Hidden Hyperbolic Kac-Moody Structures in Supergravity and a Possible Quantum Avoidance of Cosmological Singularities

5-7 mai 2018: *Workshop: Effective Field Theory Approaches to Gravity* (ETH-Institute for Theoretical Studies Zurich, Switzerland): High-Energy Gravitational Scattering and the General Relativistic Two-Body Problem

11-15 mai 2018: 50 Years of the Veneziano Model: From Dual Models to Strings, M-theory and Beyond (Florence, Italy): High-Energy Gravitational Scattering: from ACV to EOB

28 mai-1er juin 2018: Waves on the lake: the astrophysics behind gravitational waves, Lake Como School of Advanced Studies (Como, Italy): GRAVITATIONAL WAVES and BINARY SYSTEMS (4 lectures)

11-12 juin 2018: Colloque Einstein au Collège de France, (CdF, Paris, France): Comment penser le Temps après Einstein ?

11-23 juin 2018: Cargèse Summer School; Quantum Gravity, Strings and Fields (Cargèse, France): Classical and Quantum Gravitational Scattering, and the General Relativistic Two-Body Problem (2 lectures)

23-28 juillet 2018: XIX International Congress on Mathematical Physics (Montréal, Canada): GRAVITATIONAL WAVES and BINARY BLACK HOLES

9-15 septembre 2018: *Sigrav 2018 - Black Holes: Theory and Observations* (Cagliari, Italie): Life and Works of Yvonne Choquet-Bruhat: her Contributions to Gravitational Physics; and Binary Black Holes: Motion, Radiation, and Classical vs Quantum Scattering

10-22 septembre 2018: *Summer School on Mathematical Physics, Gruppo Nazionale per la Fisica Matematica*, 6 conférences : Gravitational Waves and Binary Systems (Ravello, Italie)

5, 12 et 19 octobre 2018 : *Cours de l'IHES*: 4 cours : From Classical Gravity to Quantum Amplitudes (IHES, Bures-sur-Yvette, France)

16 octobre 2018: Savant Mélange, Ondes gravitationnelles et trous noirs (La Sorbonne, Paris, France)

5-9 novembre 2018: *Gravity, l'attraction universelle, 18e colloque Wright pour la science* : Les ondes gravitationnelles et les trous noirs binaires (Université de Genève, Suisse)

26 novembre 2018: *Conférence Scientifique entre les deux Académies israélienne et française* : Gravitational Waves and Binary Black Holes (Israel Academy of Sciences and Humanities, Jerusalem, Israël)



27 novembre 2018: From Coalescing Binary Black Holes to Veneziano’s Gravitational High-Energy Scattering and Back (The Weizmann Institute of Science, Rehovot, Israël)

10-14 décembre 2018 : *QCD Meets Gravity IV* : From Coalescing Binary Black Holes to Quantum Amplitudes and Back (Nordita, Stockholm, Suède)

25-27 février 2019 : Co-organisateur de la conférence *Space Time Matrices* (IHES, Bures-sur-Yvette, France)

14-15 mai 2019: MULTI-LOOP-2019 (Sorbonne Université, Jussieu, Paris): Multi-loops in Classical Gravity

16 mai 2019 : Conférence avec l’illustrateur Mathieu Burniat autour de la BD *Le mystère du monde quantique* (Institut de Mathématiques d’Orsay, Orsay, France)

27-31 mai 2019: SOURIAU 2019 (Univ. Paris-Diderot, Paris, France): On the gravitational interaction of spinning bodies

14 juillet 2019 : Naissance et mort de l’Univers, Festival Geek-picnic (Vorobiovy gory, Moscou, Russie)

19-23 août 2019: Simons Program: Current Themes in High Energy Physics and Cosmology–Physics and Astrophysics in the Era of Gravitational Wave Detection; Niels Bohr International Academy (Niels Bohr Institute, Copenhagen, Danemark): Classical and Quantum Gravitational Scattering and the General Relativistic Two-Body Problem

24-25 Septembre 2019: Forefronts of Gravitational Physics (Princeton University, Princeton, USA)

26-27 Septembre 2019: Origins of the Universe (Simons Foundation, NYC, USA)

17-20 octobre 2019: International conference dedicated to the 100th anniversary of I. M. Khalatnikov, “Quantum Fluids, Quantum Field Theory, and Gravity” (Landau Institute for Theoretical Physics, Chernogolovka, Moscow region, Russia): Hidden Symmetries near Cosmological Singularities

18-22 November 2019: From Classical Gravity to Quantum Amplitudes and Back: post-Newtonian, post-Minkowskian, effective one-body, self-force, ... (Kolleg Mathematik Physik Berlin; Dorint Adlershof, Berlin, Allemagne)

16-17 décembre 2019 Juliafest (LPTENS, ENS, Paris): From  $E_7$  to  $E_{10}$

## LIST OF PUBLICATIONS

### BOOKS.

#### Popular Books

1. T. DAMOUR, J.C. CARRIERE;  
Entretiens sur la multitude du monde.  
2002. Editions Odile Jacob, Paris, 241 pages.
2. T. DAMOUR  
Si Einstein m'était conté  
2005. Le Cherche-Midi, Paris, 237 pages; deuxième édition Le Cherche-Midi 2012; troisième édition Flammarion, Champs Sciences 2016. [Traduction anglaise: Once Upon Einstein, 2006, AK Peters, Boston (USA). Traduction italienne: Albert Einstein La rivoluzione della fisica contemporanea, Piccola Biblioteca Einaudi Mappe, 2009. Traduction russe: Alpina Non-Fiction, 2016]
3. F. BALIBAR, T. DAMOUR  
2005. Einstein, double CD, Editions De Vive Voix (Paris), Collection Science.
4. T. DAMOUR  
2010. Espace, Temps, Matière et Force, d'Einstein à la théorie des cordes, CD 60 minutes, Editions de Vive Voix (Paris). Collection L'Académie raconte les sciences.
5. T. DAMOUR, M. BURNIAT  
2016. Le Mystère du Monde Quantique, 160 pages, Bande dessinée, Dargaud, Paris. [traduite en Allemand, Anglais, Italien, Espagnol, Coréen, Tchèque, Russe, Chinois, Turc, ...]
6. T. DAMOUR  
2019. Ondes Gravitationnelles et Trous Noirs, CNRS-Editions et de Vive Voix (Paris). 90 pages. Collection les grandes voix de la recherche.

#### Scientific Books

1. J. TRAN THANH VAN, T. DAMOUR, E. HINDS, J. WILKERSON (Editors);  
Perspectives in Neutrinos, Atomic Physics and Gravitation.  
Proceedings of the XIIIth Moriond Workshop (Villars-sur-Ollon, Suisse, January 30 - February 6, 1993).  
1993. Editions Frontières, Gif-sur-Yvette, 589 pages.

2. J. TRAN THANH VAN, Y. GIRAUD-HERAUD, F. BOUCHET, T. DAMOUR, Y. MELLIER (Editors);  
Fundamental Parameters in Cosmology.  
Proceedings of the XXXIIIrd Rencontres de Moriond (Les Arcs 1800, France, January 17-24, 1998).  
1998. Editions Frontières, Gif-sur-Yvette, 452 pages.
3. A. ASPECT *et al.*  
Einstein Aujourd'hui  
2005. EDP Sciences (Les Ulis) et CNRS Editions (Paris).
4. T. DAMOUR, O. DARRIGOL, B. DUPLANTIER, V. RIVASSEAU, Editors  
Einstein, 1905-2005. Poincaré Seminar 2005.  
2006. Birkhäuser Verlag, Basel (Suisse).
5. T. DAMOUR, B. DUPLANTIER, V. RIVASSEAU, Editors  
Gravitation and Experiment, Poincaré Seminar 2006.  
2007. Birkhäuser Verlag, Basel (Suisse).
6. *Damour:2012in* T. DAMOUR, R.T. JANTZEN, Editors  
(Series Editor: R. RUFFINI) Proceedings of the Twelfth Marcel Grossmann Meeting on General Relativity, On recent developments in theoretical and experimental general relativity, astrophysics and relativistic field theories (UNESCO Headquarters, Paris, France, 12-18 July 2009).  
2012. World Scientific, Singapore, 3 volumes: Parts A, B, C. 2660 pages.
7. T. DAMOUR, I. TODOROV and B. ZHILINSKII  
Symmetries in Nature: Scientific heritage of Louis Michel  
2013. World Scientific, Singapore.

## MISCELLANEA

- [1] T. DAMOUR  
De Zénon à Einstein: ô Temps où est ta flèche?  
in: *L'Instant de Guerlain*, plaquette publiée par Le Cherche-Midi, Paris, 2003; pp. 12-13.
- [2] T. DAMOUR, P. STARCK  
Notre instant dans l'espace-temps d'Einstein  
dessin publié dans: *L'Instant de Guerlain*, Le Cherche-Midi, Paris, 2003, p. 27.

- [3] T. DAMOUR  
Espace, Temps, Matière et Gravitation : Une brève introduction à la Relativité Générale (Avril 2004).
- [4] T. DAMOUR  
Images successives du Temps  
(Restaurateurs de montres de collection)  
in: *Le geste et la parole des métiers d'art*, sous la direction de Renaud Dutreil et d'Erik Orsenna, Le Cherche-Midi, Paris, 2004.
- [5] T. DAMOUR  
Einstein, Kant et la "réalité"  
Texte écrit de la conférence donnée au PIF9 (Physique et Interrogations Fondamentales) "Einstein et les horizons de la physique", 16 novembre 2005.
- [6] T. DAMOUR  
Pourquoi des poètes ?  
in : *Pourquoi la poésie ? Pourquoi des poètes ? Dossier-enquête*,  
Poésie 1, n° 51 (Hiver 2007-2008) Editorial Poésie Un, pp. 29-30.
- [7] T. DAMOUR  
Les pavés de la route de Chartres et les polynômes de Jones  
in: *Déchiffreurs, Voyage en mathématiques*, édité par J.-F. Dars, A. Lesne, A. Papillault, Belin, Paris, 2008.

**ARTICLES.** [Notation: [number] year: in boldface for original research papers, in roman for review articles or proceedings contributions, and in italics for popularization material. Some papers are highlighted in boldface.]

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- [2] T. DAMOUR; On the correspondence between classical and quantum energy states in stationary geometries. 1975. *Lettere al Nuovo Cimento*, **12** (n°9), pp 315-318.
- [3] **T. DAMOUR, R. RUFFINI; Sur certaines vérifications nouvelles de la Relativité Générale rendues possibles par la découverte d'un pulsar membre d'un système binaire. 1974. C.R. Acad. Sc. Paris, Série A, 279, pp 971-973.**

- [4] T. DAMOUR; Torque and momentum transfer in accreting black holes. 1975. *Annals of the New York Academy of Sciences*, **262**, pp 113-122.
- [5] *Damour:1974qv* T. Damour and R. Ruffini, “Quantum Electrodynamical Effects in Kerr-Newman Geometries,” *Phys. Rev. Lett.* **35**, 463 (1975).
- [6] *Damour:1975pr* T. Damour, “Klein Paradox and Vacuum Polarization,” In \*Trieste 1975, Proceedings, Marcel Grossmann Meeting On General Relativity\*, Oxford 1977, 459-482
- [7] T. DAMOUR; Note on the spin precession effect in a relativistic binary system. 1978. in *Physics and Astrophysics of Neutron Stars and Black Holes*, (Enrico Fermi Course LXV), edited by R. Giacconi and R. Ruffini, North-Holland, Amsterdam, pp 547-549.
- [8] *Damour:1976kh* T. Damour, N. Deruelle and R. Ruffini, “On Quantum Resonances in Stationary Geometries,” *Lett. Nuovo Cim.* **15**, 257 (1976).
- [9] T. DAMOUR, R. RUFFINI; Black-hole evaporation in the Klein-Sauter-Heisenberg-Euler formalism. 1976. *Physical Review D*, **14** (n°2), pp 332-334.
- [10] *Damour:1978ug* T. Damour and N. Deruelle, “Dressing Up A Reissner Naked Singularity,” *Phys. Lett. B* **72**, 471 (1978).
- [11] T. DAMOUR, R.S. HANNI, R. RUFFINI, J.R. WILSON; Regions of magnetic support of a plasma around a black hole. 1978. *Physical Review D*, **17** (n°6), pp 1518-1523.
- [12] T. DAMOUR; Black-hole eddy currents. 1978. *Physical Review D*, **18** (n°10), pp 3598-3604.
- [13] T. DAMOUR; Trous noirs. 1979. R.C.P. 25, I.R.M.A. (Strasbourg), **27**, pp 37-47.
- [14] T. DAMOUR; Mechanical, electro-dynamical and thermodynamical properties of black holes. 1980. in *Gravitational Radiation, Collapsed Objects and Exact Solutions*, edited by C. Edwards, Springer-Verlag, Berlin, (Lecture Notes in Physics **124**), pp 454-458.
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- [16] T. DAMOUR; Masses ponctuelles en Relativité générale. 1980. *C.R. Acad. Sc. Paris, Série A*, **291**, pp 227-229.
- [17] T. DAMOUR; Surface effects in black hole physics. 1982. in *Proceedings of the Second Marcel Grossmann Meeting of General Relativity*, edited by R. Ruffini, North Holland, Amsterdam, pp 587-608.

- [18] L. BEL, T. DAMOUR, N. DERUELLE, J. IBANEZ, J. MARTIN; Poincaré invariant gravitational field and equations of motion of two point-like particles: the postlinear approximation of general relativity. 1980. in *Abstracts of Contributed Papers for the Discussion Groups*, (9th International Conference on General Relativity and Gravitation) Friedrich Schiller University, Jena, **1**, pp 156-157.
- [19] **L. BEL, T. DAMOUR, N. DERUELLE, J. IBANEZ, J. MARTIN; Poincaré-invariant gravitational field and equations of motion of two pointlike objects: the postlinear approximation of general relativity. 1981. *General Relativity and Gravitation*, **13** (n°10), pp 963-1004.**
- [20] T. DAMOUR; Problème à deux corps en relativité générale. 1981. in *Atti del 4° Convegno Nazionale di Relatività Generale e Fisica della Gravitazione*, Tecnoprint, Bologna, pp 19-22.
- [21] *Damour:1981bh* **T. Damour and N. Deruelle, “Radiation Reaction And Angular Momentum Loss In Small Angle Gravitational Scattering,” *Phys. Lett. A* **87**, 81 (1981).**
- [22] **T. DAMOUR, N. DERUELLE; Lagrangien généralisé du système de deux masses ponctuelles, à l’approximation post-post-newtonienne de la relativité générale. 1981. *C.R. Acad. Sc. Paris, Série II*, **293**, pp 537-540.**
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- [26] **T. DAMOUR; Problème des deux corps et freinage de rayonnement en relativité générale. 1982. *C.R. Acad. Sc. Paris, Série II*, **294**, pp 1355-1357.**
- [27] **T. DAMOUR; Gravitational radiation and the motion of compact bodies. 1983. in *Gravitational Radiation*, edited by N. Deruelle and T. Piran, North-Holland, Amsterdam, pp 59-144.**
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- [29] P. TOURENC, T. DAMOUR, J. SHARMA, C.J. BORDE; Ultra-high resolution laser spectroscopy of atoms as a probe of gravitational fields including gravitational gradation. 1983. in *Contributed papers, 10th International Conference on General Relativity and Gravitation*, **2**, edited by

- B. Bertotti, F. De Felice, A. Pascolini, Consiglio Nazionale delle Ricerche, Roma, pp 933-935.
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- [32] C.J. BORDE, J. SHARMA, P. TOURENC, T. DAMOUR; Theoretical approaches to laser spectroscopy in the presence of gravitational fields. 1983. *J. Physique, Lettres*, **44** (n°24), pp L-983 – L-990.
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